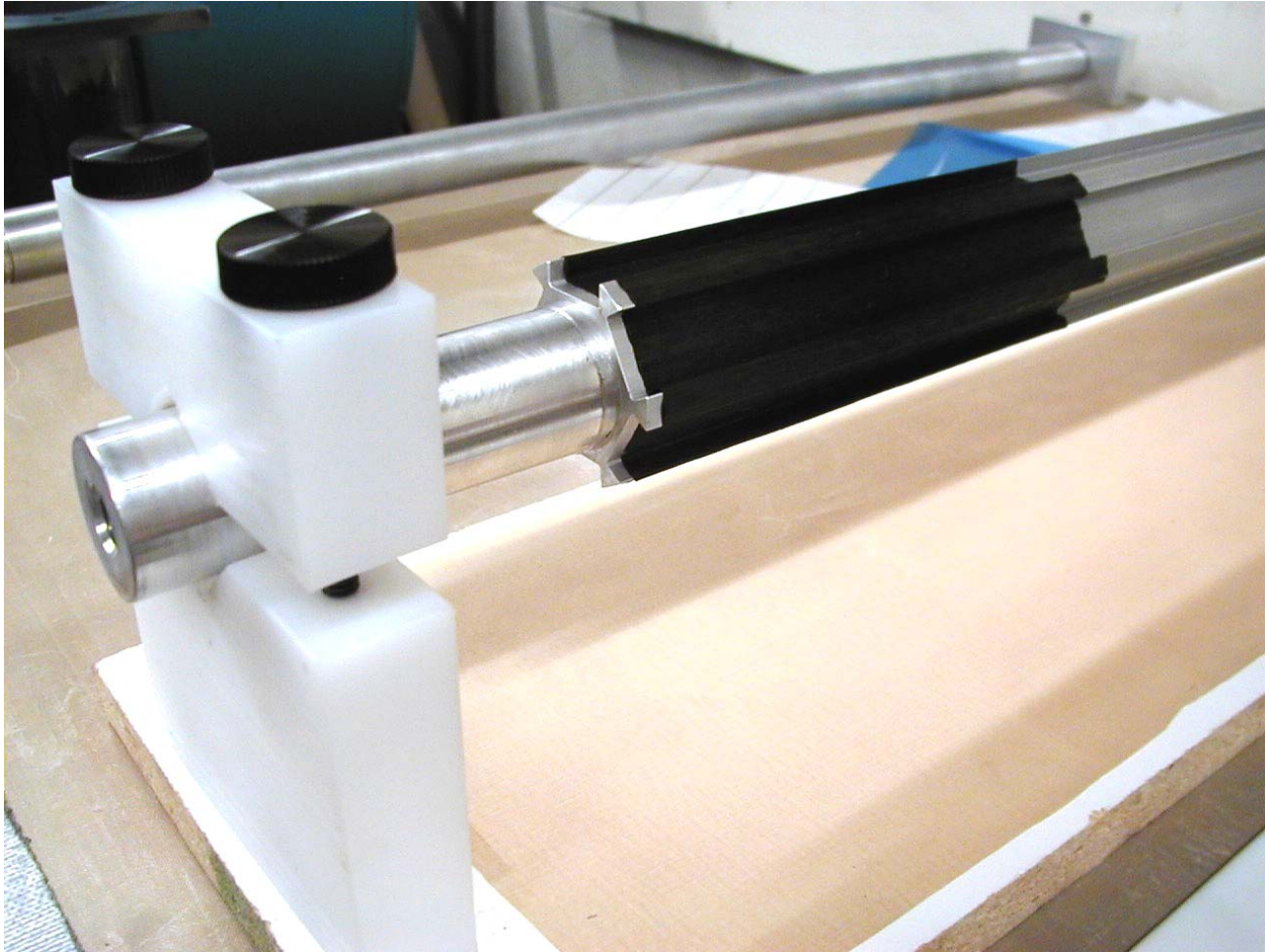


LØ Support Structure Fabrication



Fabrication Steps

- Prepare the material.
- Prepare the mandrel.
- Material lay-up.
- Install the soft outer mold system.
- Install the vacuum bag.
- Load the wrapped mandrel into the autoclave.
- Load oven and cure.
- Remove the cured part from the mandrel.

Material Preparation - $[0/20/-20]_s$

- Parent roll is removed from the freezer 12 hours before layout and cutting of the (6) layers.
- Material must be inspected for defects and errant embedded fibers, which are trimmed out when possible.
 - Efforts to conserve material have resulted in the use of some poor quality sections.
- Cut layers to size.
- Reference lines are transferred to the backing paper to aid in fiber orientation during the lay-up.

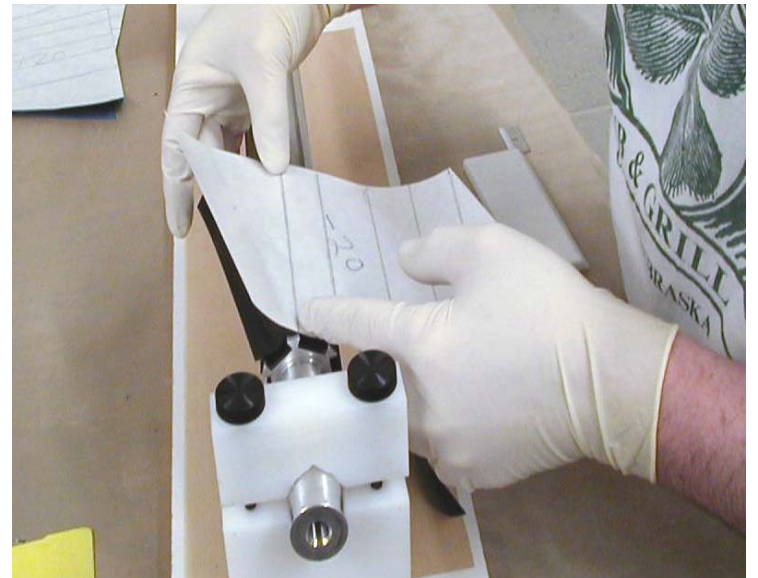


Mandrel Preparation

- Mandrel is polished with a fine abrasive pad (Scotchbrite®) to remove any residual material from previous lay-up.
- Clean with soap and water, dry.
- Clean with pure ethanol.
- Apply mold release.
 - 2-3 coats of *FibRelease*, water-based, non-silicone mold release agent. Available from Fibre Glast Corp:
<http://www.fibreglast.com/ReleasesPage.htm>
- Pre-heat mandrel to 80°F immediately before applying 1st layer of pre-preg.
 - Facilitates adhesion between pre-preg and mandrel.

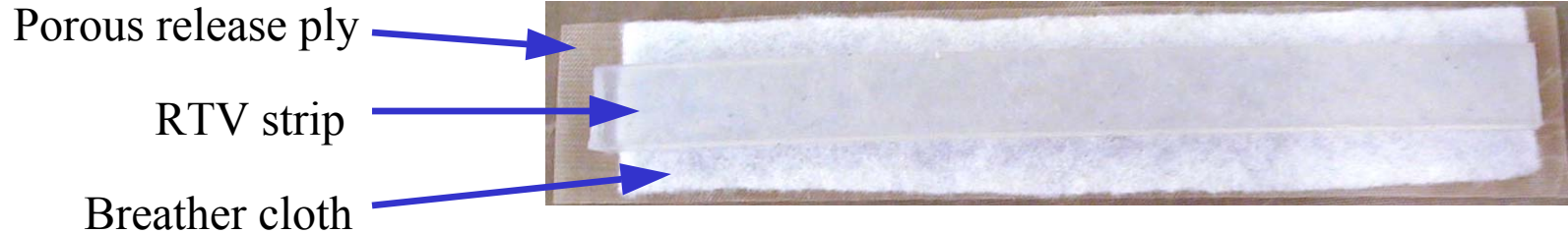
Material Lay-up

- 1st layer [0°] will adhere (weakly) to the heated mandrel. Subsequent layers adhere to their previous layers.
- To preserve the integrity of the material, the backing paper is “pre-released”, then lightly re-attached for handling and fiber orientation.
- Backing paper is removed and discarded once the layer has been configured to the 1st set of mandrel features.

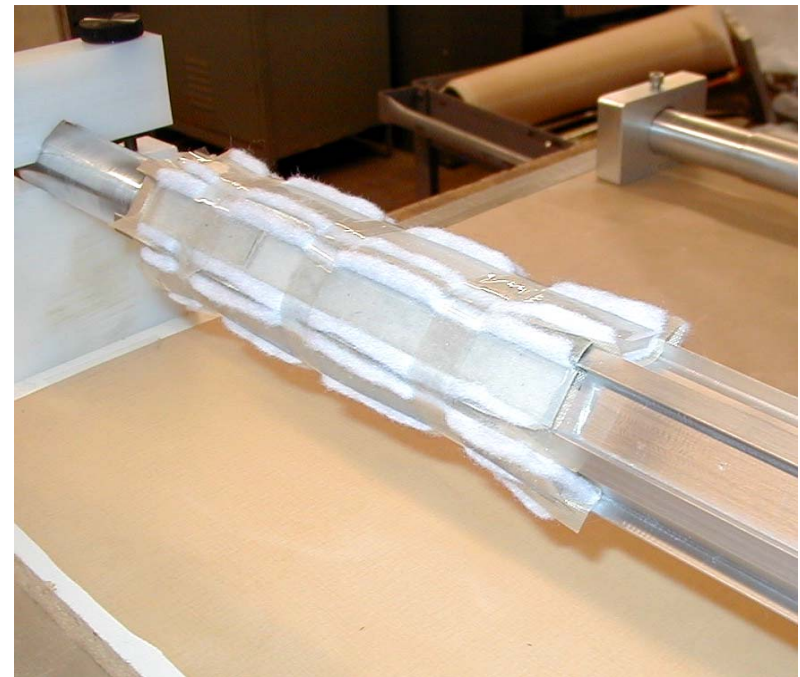


Outer Mold System – RTV Pressure Strips

Single Segment



- System is installed in (6) segments.
- Pressure applied to the RTV strips forces the lay-up against the mandrel.



Outer Mold System – Vacuum Bag

- The finished lay-up is first wrapped in breather cloth, then nylon film, sealed to form a 'bag' using vacuum tape.
- The 'bagged mandrel' is vacuum tested to eliminate leaks (shown at right).



Outer Mold System - Autoclave



- Allows for application of 85 psig of external pressure to the lay-up during the cure.
- Bagged mandrel is loaded into the autoclave. Pressure and vacuum connections are made through the cover plate using quick-disconnect fittings.



Cure Process

- Load the autoclave into the oven and connect pressure and vacuum lines. Insure that thermocouple is contacting surface of autoclave.
- Start vacuum pump and open pressure valve (85 psig).
- Turn on oven heaters. Set thermostat to 275°F.
- Monitor temperature until stabilized at 275°F (30 min. typ). Start timer.
- Cure for 2 hours.
- Shut off heaters and vacuum pump. Leave pressure valve opened.
- Remove from oven after cooling (typically overnight).



Mandrel Removal

- The vacuum bag and RTV segments are removed, leaving the finished part tightly gripping the mandrel.
- A female RTV casting of the mandrel is wrapped around the finished part to provide a large, uniform grip surface.
- An 8” steel extension is threaded onto the end of the mandrel.
- Using a firm grip, the steel end is sharply struck against a solid surface (the concrete floor). A single strike will typically break any bonds between the part and the mandrel, resulting in ~1” of movement.
- After 2-3 more strikes, the part can be slid from the mandrel.